



**SHAFFER·KRIMMEL·SILVER**

& ASSOCIATES, INC. CONSULTING ENGINEERS

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November 7, 1983

HAROLD S. SHAFFER, PE-SE  
ROBERT G. KRIMMEL, PE-LS  
VAN A. SILVER, PE

SKS #7286

Mr. Lawrence W. Eastep, P.E., Manager  
Permits Section  
Division of Land Pollution Control  
Illinois Environmental Protection Agency  
2200 Churchill Road  
Springfield, Illinois 62706

Attn: Ms. Sally Springer

Re: Log #588

EPA Region 5 Records Ctr.



358702

Dear Ms. Springer:

This letter is to confirm my telephone conversation today with Ms. Springer concerning a recent supplemental permit application we submitted on behalf of our client the Macon County Landfill Corporation for an updated ground-water monitoring system for their operation. It was our intent that the proposed system be to monitor the ground-water for the existing landfill operation as well as two extensions to the west which are under development. We wish this new supplemental permit to ultimately monitor those landfill areas covered by the following permits:

111580408 - Macon County  
Decatur/Macon County Landfill  
#2 - Permit No. 1976-4-OP  
#3 - Permit No. 1978-7-DE  
#4 - Permit No. 1979-18-DE

Also enclosed are three copies of the aerial photo showing the proposed monitoring well locations with well numbers corrected.

We understand you desire for a meeting to discuss this system. We are ready at your convenience. Please call.

Very truly yours,

SHAFFER, KRIMMEL, SILVER & ASSOCIATES INC.

BY:

Robert G. Krimmel, P.E.

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RGK/sal

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LAND SURVEYORS • CONSTRUCTION QUALITY CONTROL • MATERIALS TESTING

PROPOSED  
GROUND-WATER MONITORING SYSTEM  
MACON COUNTY LANDFILL #2

PREPARED FOR  
MACON COUNTY LANDFILL CORPORATION  
R.R. #8, HILL ROAD  
DECATUR, ILLINOIS

PREPARED BY  
SHAFFER, KRIMMEL, SILVER & ASSOCIATES, INC.  
CONSULTING ENGINEERS  
DECATUR, ILLINOIS

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PROJECT NO. I7-7286-1267  
OCTOBER - 1983

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SUBSURFACE CHARACTERISTICS

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Three separate soil and foundation investigations have been performed at the subject site. The original test borings were made in 1972 as part of the requirements for a permit to develop and operate a solid waste management site (designated as first extension); the logs of the borings and the analysis pertaining to the site geology, soils and hydrology are contained in a report dated November 1972. A second investigation was made in 1977 to fulfill the requirements for a permit to develop and operate the second extension; the results of this investigation was submitted to the agency in September 1977. Supplemental probe borings were made in 1978 and 1979 as requirements for a supplemental permit to modify the existing development permit for the second extension. The logs of borings and their analysis are contained in a report dated September 14, 1979. Copies of these reports and pertinent drawings showing stratigraphic relationships of the site are enclosed with this submittal.

ANALYSIS

A review of the previous subsurface investigations indicates that soil types and soil stratigraphy at the site are erratic and nonhomogeneous, and based on the many borings there does not appear to be a well-defined continuous, water-bearing aquifer (Henry Formation) within the existing and future operations (areas and depths covered by the existing soil investigations (Elev 546 to 585), which is as much as 30+ feet lower than the proposed lowest landfill development (Elev 575). On the other hand, there does appear to be a relatively thick water-bearing sand stratum on the river-side/down-slope side of the existing operation and future landfill developments. The top of this sand stratum, which is believed to be the Henry Formation, is at elevations which vary from 569 near the Sangamon River to 577 near the bluff.

The landfill is built in the base of the bluffs on the northern edge of the Sangamon river flood plain. This development is separated along its southern edge from a potentially pervious aquifer by fine-grained alluvial and/or post-glacial deposits 15 feet, or less thick. A head differential between the elevated leachate in the landfill and the valley aquifer will promote movement of seepage downward and

radially outward from the landfill. Most of the seepage will discharge to the Sangamon River if not intercepted by impervious liners, or berms; however, some seepage could conceivably move up-gradient in permeable sand deposits or fractured tills containing thin sand lenses. The proposed monitoring system is based on this interpretation of ground-water geologic condition at the site.

The valley aquifer has no real significance as a major source of the water supply except for isolated homes in the Sangamon River Valley. Likewise, the upland interglacial deposits are very low producers and are tapped for home water supply only. There are no known local or regional sources affecting the ground-water level at the site.

Horizontal and vertical ground-water gradients and fluctuations are not available as the ground-water level is generally lower than the landfill bottom and the existing monitoring wells. A current ground-water surface map of the site is not available for reasons previously stated. Likewise, a complete assessment of the current ground-water quality at the site is not available. The proposed ground-water monitoring network is designed to correct this deficiency.

#### GROUND-WATER MONITORING SYSTEM

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#### WELL LOCATION

The proposed ground-water monitoring system is designed to detect seepage into and beneath the landfill site and to detect seepage from the landfill operation. Two existing shallow wells for local homeowners potable water supply will be used for detecting any leachate exfiltration into shallow sand deposits. Five new GMMW will be installed on landfill property and/or on nearby property with a perpetual lease for detecting both seepage infiltration into and exfiltration out of the landfill site. Proposed locations are shown on Figure 1.

Specifically, monitoring well MW-4 is an existing shallow well which will continue to serve as an up-gradient background well; well MW-8 is an existing shallow down-gradient well which will be used to determine the impact of any leachate exfiltration on the water quality in the valley aquifer. Well MW-5 will be a new up-gradient well for monitoring deep ground-water movements (if any) in sand units in the glacial till. Well MW-6 will be a new up-gradient well located in

the valley aquifer (Henry Formation) and will provide background water quality. Wells MW-7 & 10 are located on the down-slope or lower ends of the first and second landfill extension, in order to detect exfiltration from the landfill. Well MW-7 may or may not penetrate the valley aquifer; wells MW-9 & 10 are expected to penetrate the edge of the valley aquifer.

#### WELL DESIGN AND INSTALLATION

The bore holes for monitor wells MW-5, 7, 9 & 10 will be drilled a minimum of 30 feet below the proposed lowest bottom grade (Elev 575) of the first and second landfill extensions. The bore holes for well MW-6 will be drilled until the till underlying the Sangamon River flood plain is reached.

Where significant water-bearing materials are the aquifers expected at wells MW-6, 9 & 10 the screen will fully penetrate the aquifer in order to detect a contaminant plume moving at any level in the aquifer. Interglacial sand units located near or below the proposed landfill bottom grade in wells MW 5 & 7 will be screened in order to detect any contaminants which may seep through in-situ glacial till and/or compacted liners.

*10' max  
too much  
dilution*

Hollow stem auger and/or rotary-wash drilling methods will be used to advance the bore holes, and soil samples will be obtained at about 5-ft intervals in order to determine subsoil types and their stratigraphy. Monitor wells will be constructed of 2-in. flush joint, Schedule 40 PVC casing (riser) and No. 6 or 10 machine slotted, Schedule 40 well screen. The screen and riser pipe will be clean of any oil, grease or other contaminants, and no glue or cleaner will be used in well construction unless the joints have cured in the air for at least three days. Details of monitoring wells are shown on Figure 2.

Once the well screen and riser have been installed to the proper depth and centered in the cased/uncased bore hole, the annular space outside the well screen will be backfilled with a clean quartz sand to 2 to 3 feet above the top of the screen. The remaining annular space will be filled with cement/bentonite grout. The screen and backfill may be backwashed with clean water to remove fine-grained sediment prior to grouting. A lockable steel security protecting pipe will be placed around those wells projecting above grade. All wells will be fully developed by bailing and/or pumping.

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#### WATER-QUALITY PARAMETERS

Ground-water will be tested initially for the following contamination indicators: Iron (Fe), Boron (B), Chloride (Cl), Ammonia (NH<sub>3</sub>), Mercury (Hg), Total Dissolved Solids (TDS), Zinc (Zn), Manganese (Mn), Hardness as CaCO<sub>3</sub>, Residue on Evaporation (ROE) and COD. The results will be analyzed and several key contaminant indicators will be then selected for routine analysis during the monitoring program. The entire contaminant indicator list will be tested periodically to insure that the key indicators are adequately monitoring any leachate exfiltration from the landfill. The planned sampling interval is quarterly.

#### SAMPLING PROCEDURES

Standing water in the monitoring wells will be removed prior to sampling by bailing, pumping or some other suitable device. Ideally, four to five well volumes will be removed, but if the well yield is too low to maintain continuous flow, the wells will be pumped and/or bailed dry and then sampled after the water level recovers.

Samples will be collected with a PVC bailer attached to a new rope. The bailer will be rinsed inside and out with distilled water a minimum of four times prior to each use. Sample bottles will be rinsed and prepared according to Agency procedures.

Attachments: Three Soil Investigation Reports (1972, 1977-1979)  
Location Map

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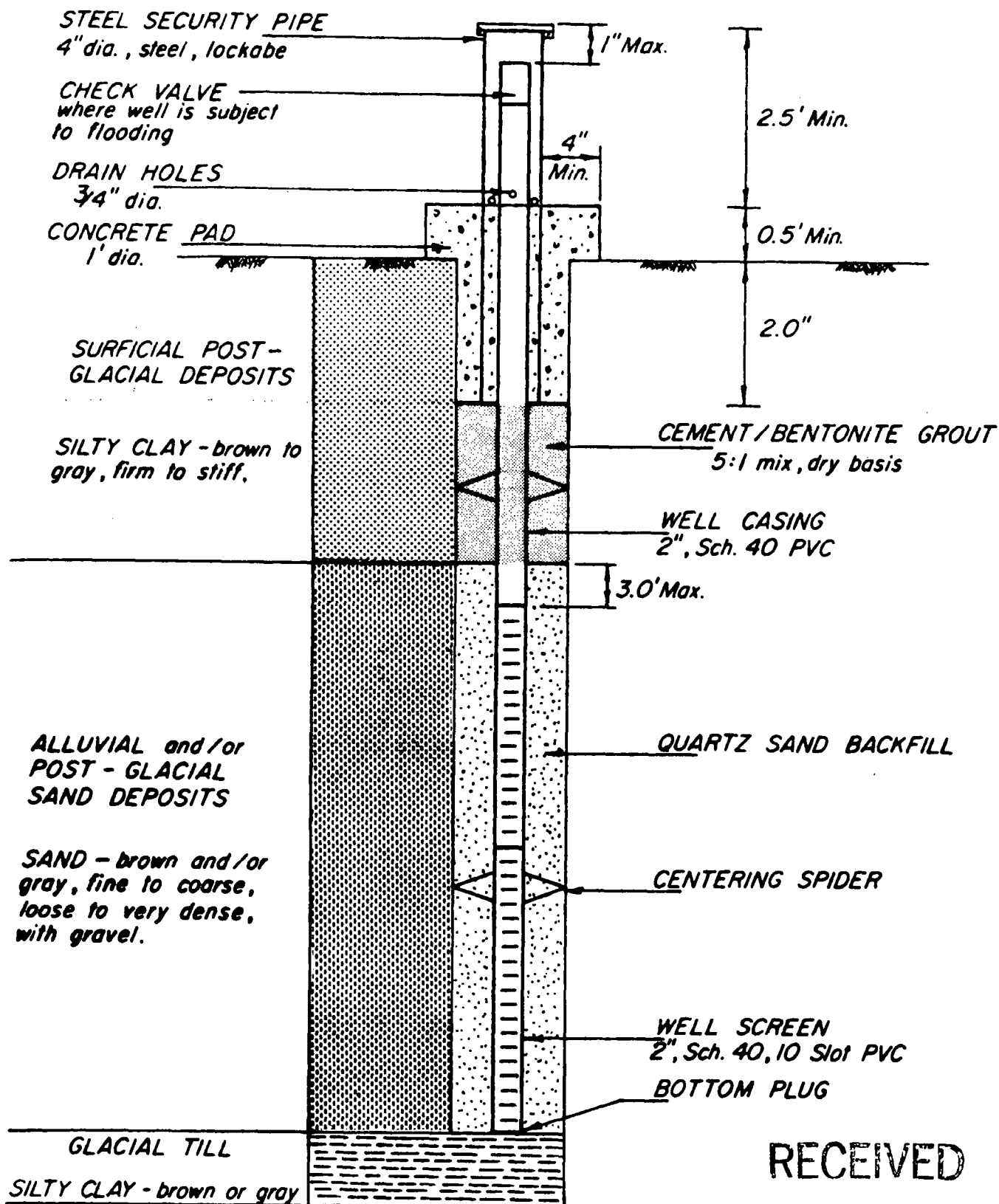
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## MONITORING WELL DETAIL

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STATE OF ILLINOIS  
ENVIRONMENTAL PROTECTION AGENCY

Subject \_\_\_\_\_  
Data \_\_\_\_\_  
Reviewed by \_\_\_\_\_  
Date 9/13/83

MEETING

MAHON Co. LF

WRC

John STUBENT

DON WILLIAMS

BOB KRIMMER

JIM SPAR

1976-04-09/08 LAND E OF STORM SEWER

TO OLD ~~LF~~ (CLOSED) LF.

585-590 LF BASE

← SPRING 1976 MONITORING WELLS INSTALLED

DIRECTION OF GW FLOW ?